# Problems plague Plum Island sewer

Newburyport -

Plum Island's new air-vacuum sewer is failing, and without significant changes, the city will not be able to maintain the system.

That was the news delivered by Collection System Manager Jamie Tuccolo in a Valentine's Day memo to the city's Board of Sewer Commissioners. According to Tuccolo, the vacuum sewer system that cost islanders from Newburyport and Newbury betterment fees of at least $10,763 and $10,401, respectively, is fundamentally flawed. And at this point, it's unclear how the city plans to fix it.

Over the past couple of months, sewer department crews have been responding to an increasing number of sewer alarms with jackhammers, sledgehammers and steel bars to remove ice from many of the system's 637 household valve pits, where waste is held until a valve opens to release it into the system.

The pits have been frozen with up to 18 inches of solid ice; valves are frozen closed; controllers for the valves are freezing open or closed or are being unseated by ice. In addition to freezing caused by water in the pits, valves are freezing due to the constant stream of freezing ambient air being pulled in through "candy cane" vents, Tuccolo wrote.

But no matter what's affecting the valves and whether they freeze open or closed, the outcome is the same – backup.

"These problems are due to either improper equipment, poor design or incorrect installation, or a combination," wrote Tuccolo in his memo.

Mayor John Moak has stepped in and scheduled a March 12 meeting with AIRVAC, the manufacturer of the vacuum system, and representatives from CDM, the firm that designed Plum Island's water/sewer project.

"Our job is to find out what the problem is," Moak said this week, "and analyze what a solution might be."

According to Tuccolo, options for fixing the problems include: waterproofing all the pits; installing drain tubes; putting antifreeze in the pits; installing an alarm system that will identify exactly which pit is not operating; installing battery-operated heaters in the pits; replacing all O-rings to stop the controllers from being unseated by the ice; and replacing other parts that are freezing.

There is a gauge on the tank in the pumping station on Olga Way. When the pressure gets too low, an alarm is sent out to the pagers of operations staff in the Sewer Dept. Between Jan. 14 and Feb. 10, the department racked up 826 hours of overtime looking for and dealing with the frozen pits.

According to Moak, the sewer department would need City Council approval to transfer funds to cover such overtime, but the funds would come from the sewer department, which is self-supporting through sewer rates.

CDM, a global consulting and design engineering firm based in Cambridge, recommended the vacuum sewer system to the Plum Island project, DPS Director Brendan O'Regan said last week. CDM is now pointing a finger at AIRVAC, an Indiana-based company that has been manufacturing air vacuum sewers since 1947. CDM design engineers have concluded that the problem is with the equipment, not their design of the project.

But according to Tuccolo, CDM design engineers chose to place most of the valve pits in the road, rather than off to the side, as AIRVAC recommends. As a result, most of the valve pits do not have the benefit of being insulated by snow cover.

Tuccolo also noted that at least half of the pits are too shallow, and some candy cane vents were placed less than 20 feet from the pits. AIRVAC recommends a minimum 20-foot separation.

An AIRVAC field crew conducted a system evaluation on Feb. 10 and 11, and concluded about the Plum Island system, in part: "freezing - worst we have seen at any project." AIRVAC has since notified the city via letter that the problem is due to "operator error."

There were freezing problems with the system over the last two winters, but not on the scale that sewer crews are seeing now. This is the first winter in which the whole island was connected, and it has been the coldest winter of the last three years.

Tuccolo has been in contact with operators of vacuum sewers in Michigan, Alaska and Provincetown.

"The operators from Patterson, Michigan, have also confirmed their pits were freezing," he wrote, "however, in their system, as AIRVAC recommends, the valve pits are off to the side of the road."

In Alaska, the pits are located in the basements of homes and have a closed-loop heating system. Provincetown, which enjoys milder winters than Newburyport, has not seen widespread problems with frozen valves.

Ward 1 City Councilor Larry McCavitt, who read the memo and listened to the explanations presented at the Feb. 26 meeting of the Board of Sewer Commissioners, asked the question that will probably be on the minds of many residents when they learn the full extent of the problem. "We didn't think of this in the initial design, or what?" asked McCavitt.

But, rather than answer McCavitt's question, Tuccolo wanted to focus on the future and how to fix the numerous issues that have resulted in "significant operational problems. And Tuccolo stressed that, while the backups are occurring on Plum Island, the problem is affecting the entire city.

"The increase in alarms has further affected the sewer department's manpower by requiring more than usual after-hour calls. This has had a negative impact on the Sewer Department's ability to address regular maintenance issues, both on the system and at the Waste Water Treatment Plant," he wrote.